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High Lysine Corn Fed Free-Choice to Growing-Finishing Swine

Richard C. Wahlstrom and George W. Libal

Analyses of opaque-2 corn have indicated a higher content of lysine and tryptophane than found in normal corn. Since these two amino acids are the most limiting amino acids in most practical swine diets, opaque-2 corn should permit a reduction in the need for supplementary protein. Experiments conducted at the South Dakota Agricultural Experiment Station and at other Experiment Stations have shown this to be true, with less protein supplement needed in swine rations containing opaque-2 corn than in rations containing normal corn.

Over 1.5 billion bushels of corn annually are fed to pigs in the United States. Much of this is fed to pigs on a free-choice basis. It is often said that pigs do a good job of balancing their ration when fed grain and supplement free-choice. Since opaque-2 and normal corn do not differ greatly in protein content, this experiment was conducted to study feed consumption and pig performance when growing-finishing pigs were fed opaque-2 or normal corn free-choice or in a complete mixed diet.

Experimental Procedure

Sixty weanling, female pigs averaging approximately 56 lb. were allotted into 12 lots on the basis of weight and litter. Three lots were randomly assigned to each of the four treatments as follows:

1. Normal corn and protein supplement free-choice
2. Opaque-2 corn and protein supplement free-choice
3. Normal corn and protein supplement as complete mix
4. Opaque-2 corn and protein supplement as complete mix

The composition of the protein-mineral-vitamin-antibiotic supplement is shown in table 1. The complete mixed diets were composed of 80% corn and 20% supplement until the pigs weighed about 110 lb. and then the diets were changed to 90% corn and 10% supplement. The calculated protein contents of the complete mixed diets were 15.2 and 12.1% for the two feeding periods, respectively.

The pigs were housed in inside, concrete-floored pens with access to outside concrete lots where the feeders were located. Pigs were removed from the experiment when they weighed approximately 205 lb.

Results

Table 2 contains a summary of the feed consumption and pig performance data. There were essentially no differences in average daily gain between pigs fed opaque-2 corn or normal corn on a free-choice basis. Pigs fed the opaque-2 corn in a complete mixed diet gained 0.16 and 0.32 lb. per day faster than those pigs fed the normal corn mixed diet during the growing and finishing periods, respectively. These pigs also gained slightly faster than either of the free-

choice treatments during the growing phase, but gains were similar during the finishing period. It would appear that the normal corn mixed diet may have been low in lysine content particularly for the finishing pig. Calculated lysine contents of this diet were 0.73 and 0.49% for the growing and finishing diets, respectively.

Pigs fed the complete, ground and mixed diets consumed approximately 0.5 to 1.0 lb. more feed per day than those pigs fed free-choice. Of particular interest is the comparison of corn and protein supplement consumption of pigs fed opaque-2 or normal corn free-choice. Pigs fed the opaque-2 corn consumed about 0.5 lb. less supplement and 0.5 lb. more corn than those pigs fed normal corn. Protein supplement was consumed in excess by the pigs fed normal corn. Their average daily diet as consumed averaged 16.7% protein while the pigs fed opaque-2 corn selected a diet averaging 13.0% protein. Since the opaque-2 and normal corn were similar in total protein content, the difference in supplement consumption may represent the different lysine needs and/or it may reflect a difference in palatability of the two types of corn.

Feed efficiency was excellent when pigs received either type of corn and supplement free-choice and did not differ between the two treatments. Approximately 15% more feed was required per pound of gain when opaque-2 corn was fed in the complete mixed ration than when it was fed free-choice. In the normal corn treatments, 30% more feed was needed by pigs fed the ground and mixed diets. This difference was no doubt increased because of the poorer growth of these pigs.

Summary

In this experiment pigs fed normal corn or opaque-2 corn, which contains a higher level of lysine, had a similar rate and efficiency of gain when fed the corn and supplement on a free-choice basis. However, pigs fed the high lysine corn consumed an average of 0.5 lb. less supplement and 0.5 lb. more corn daily resulting in more economical production.

Feed per gain was less when pigs were fed free-choice compared to a ground-mixed diet. The normal corn ground-mixed diet used in this experiment appeared to be deficient in lysine as pigs fed this diet gained 0.26 lb. per day less and required 0.34 lb. per day more feed than pigs fed the high lysine corn mixed diet.

Table 1. Composition of Supplement

Ingredient	Percent
Soybean meal, 44%	63.1
Meat and bone meal, 50%	20.0
Dehydrated alfalfa meal, 17%	10.0
Dicalcium phosphate	3.5
Ground limestone	0.5
Trace mineral salt, 1% zinc	2.5
Vitamin-antibiotic mix[a]	0.4

[a] Provided 6,800 I.U. vitamin A, 2,000 I.U. vitamin D, 8 mg. riboflavin, 16 mg. calcium pantothenate, 36 mg. niacin, 40 mg. choline, 20 mcg. vitamin B_{12} and 50 mg. aureomycin per lb. of supplement.

Table 2. Results of Feeding High Lysine Corn Free-Choice or in Mixed Rations for Growing-Finishing Swine

	Normal corn Free-choice	High lysine corn Free-choice	Normal corn Complete mix	High lysine corn Complete mix
Number of pigs[a]	15	15	15	15
Avg. initial wt., lb.	56.2	55.8	56.2	56.2
Avg. final wt., lb.	208	205.9	195.2	204.5
Avg. daily gain, lb.				
To 110 lb.	1.54	1.50	1.45	1.61
110 lb. to final	1.71	1.68	1.38	1.70
Entire trial	1.64	1.60	1.40	1.66
Avg. feed cons./day, lb.				
Protein supplement	1.13	0.59	--	--
Corn	3.44	3.94	--	--
Total	4.57	4.53	5.00	5.46
Avg. feed/gain, lb.				
To 110 lb.	2.74	2.61	3.03	2.81
110 lb. to final	2.80	2.98	4.04	3.57
Entire trial	2.79	2.85	3.63	3.29

[a] Three replicated lots of 5 gilts per treatment.